Table 8. Production of

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	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879
Donets Basin	256	330	595	617	573	842	957	801	1130	1253
Dombrowa Basin	330	301	298	336	402	408	423	612	1070	1085
Russian Empire	700	830	1100	1200	1300	1700	1900	1800	2500	2900
% of Donets Basin	37	41	54	52,5	44	49	50	44,5	45	43

	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
Donets Basin	3930	4850	4890	5110	6790	7570	9220	11*	10,9	10,7
Dombrowa Basin	3160	3350	3680	3660	3760	4090	3970	4,2	4,2	4,3
Russian Empire	7600	8800	9100	9400	11,3*	12,3	14	16,2	16,6	16,5
% of Donets Basin	52	55	53,5	54,5	60,5	61,5	66	68	65,5	65

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Donets Basin	25,3	27,6	26,6	28,7	25	9	5,6	4,6	5,8	7,2	8,1
Kusnetsk Basin	0,8	0,9	1	1,2	1,1	0,9	0,9	0,9	0,8	0,9	0,8
Soviet Union	29,1	31,8	30,9	34,5	31,3	12	7,2	7,2	8,2	11,3	12,7
% of Donets Basin	87	87	86	83	80	75	78	64	70,5	63,5	64

* From 1900 in Million t total for Empire from 1897.

2. Branches and Areas of Industry

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The Donets Basin is the center of the heavy iron industry, heavy engineering, the non-ferrous industry and the production of chemicals on a large scale. The many electricity and overland generating plants that have sprung up almost contiguously utilise coal waste as a rule and have a considerable capacity, the largest being those at Shterivka and Zujivka with 150 000 KW each. There was a lively demand for machinery, above all for agricultural machinery, while the metal industry never reached the same level. Before World War I Ukraine contributed scarcely 17 % of all those employed in the manufacture of metal wares in Russia, though it supplied $^2/_3$ — $^3/_4$ of the raw materials required by the heav, iron industry throughout Russia. In 1934 the Ukrainian share in the manufacture of iron ore was constantly declining, so that metal goods of even fairly simple nature had to be imported.

Coal in Donets Basin

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1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892
1414	1495	1740	1758	1665	1883	2110	2060	2500	3110	3000	3140	3570
1285	1400	1400	1600	1665	1800	1990	2050	2420	2480	2470	2600	2890
3300	3500	3800	3900	3900	4300	4600	4600	5400	6200	6000	6200	7000
43	42,5	46	45	42,5	44	46	45	46,5	50	50	50,5	51

1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915
11.6	13	12,9	14,2	18,2	17,9	17,7	16,7	19.9	21,4	25,3	27,6	26,6
4,8	4,8	3,6	4,6	5,4	5,6	5,7	5,5	5,8	6,4	6,9	3,8	—
17,9	19,6	18,7	21,7	26	25,9	26	24.9	28,4	31,1	36	35.6	30,9
65	66,5	69	65,5	70	69	68	67	70	69	70	78	86

1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
11.8	12,5	19,6	24,6	27,3	31	36,5	40,9	44	51	61,4	69,6	77,5	77,5
1	1	1,8	2,6	2,6	3	3,6	5,5	7,3	9.2	11,6	14,1	17,3	17,8
16,3	16,5	25,8	32.3	35.5	40	47,8	56,8	64,4	76,3	93,6	109	126	128
72,5	76	76	76	77	77,5	76,5	72	68,5	67	65,5	64	61,5	60,5

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The largest centers of production in the Donets Basin are Stalino, Makijivka, Kramatorska, Voroshylivhrad, Horlivka, Konstantynivka, Artemivske (Bakhmut), Slovianske etc. Mariupil is the exporting harbor.

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At the Dnipro Bend there are, among others, plants for best quality steel, ship-building yards, electro-technical factories and largescale chemical works. The gigantic power-station at Dnipropetrivske has a capacity of 558 000 KW. The main centers of production are Dnipropetrivske, Zaporizha, Dniprodshershinske, Kryvyj Rih and Nikopil. The exporting harbors are Mykolajiv and, for some products, Kherson.

The Donets Basin and the Dnipro Bend are frequently combined to-day and represent a many-sided economy on a wide basis of raw materials and power. As a combine it is contrasted with the Ural-Kusnetsk Combine (above all as regards coal and iron). Kerch with its ore mines and heavy industry gravitates towards the Donets Combine.

3: Mirchuk S-4 (no date) 1949 RDI Ukraine RDI

Ukraine (1868—1937; in 1000 tons and %)

1889	1890	1891	1892	1893	970	1245	1925	2120	3065
—	20	—	26	29½	1895	1896	1897	1898	1899
344	376	472	560	650	1210	—	1380	—	1620
—	1007	—	970	1030	2900	—	4100	—	5800
—	1900	—	2100	2200	33½	—	47	—	53

1910	1911	1912	1913	1914	1913	1914	1915	1916	1917
4260	5020	5780	6850	4800	6870	4800	4400	5500	3800
1180	1530	1850	1875	1085	1875	1085	—	800	510
5800	7000	8200	9300	6300	9200	6100	5700	6500	4500
73½	72	70½	76	74½	74½	78½	77	84½	84½

1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
4700	5700	7800	8000	8400	9300	13700	17000	17100	17200
1100	1770	1800	2000	3200	4100	6200	7680	(8300)	8700
6500	8000	10400	10700	12200	14500	21800	27100	27900	27800
72½	71	75	75	69	64	63	62½	(61½)	62

1886 marked the beginning of the production of manganese ore in Nikopil which reached 276 000 t in 1913, i. e. 22 % of the production for Russia and almost 12 % of that for the world. Ukraine came third after Georgia and India. In the year 1932/33 it even topped world manganese ore production with 483 000 t (the figure for the world being 1.5 % million, to which Nikopil contributed 32 %, Chiatury 20 %, India 15 %). From 1934 it slid down to the second place, though production actually increased to approximately 1 million in the years 1935—37 (more than a quarter of the world production)

4. Heavy Industry

Heavy iron industry in Ukraine has unparalleled resources of raw material at its disposal. It is true that the coal reserves in the Donets Basin do not reach those of the heavy industries in the Ural and Western Siberia (70 milliard t, of which scarcely ¼ is of good coking quality, compared with 250 milliard t,

Table 10. Nikopil in World

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	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899
Nikopil	9	11	29	73	58	51	46	48	60	97
Chiaturi	140	102	170	70	97	170	160	320	280	549
Russian Empire	162	114	200	143	157	222	208	370	342	648
Nikopil %	5,5	9,5	14,5	50	38,5	23	22	13	17,5	15
India	—	—	—	—	12	16	58	75	61	89
Brazil	—	—	—	—	2	5	14	16	26	65
World Production	375	260	375	310	385	395	490	630	590	990
Nikopil %	2.5	4	8	23	15	12,5	9,5	7,5	8	10
Nikopil's place in world production	—	—	4.	1.	2.	2.	3.	3.	3.	2.

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Nikopil	239	276	227	187	100	9	0,5	6	42	111
Chiaturi	663	258	258	204	26	55	121	—	53	194
Soviet Union	907	537	472	393	126	66	125	12	103	313
Nikopil %	26,5	51,5	48	47,5	79,5	14,5	0,5	50	40	35,5
India	694	418	665	600	526	547	748	690	482	706
Brazil	184	289	503	533	393	206	354	276	341	236
Gold Coast	—	—	4	32	31	36	44	7	67	142
Egypt	—	—	—	—	—	49	78	55	104	132
World Production	1870	1410	1860	2080	1750	1160	1160	1180	1220	1750
Nikopil %	13	19,5	12	9	5,5	1	—	0,5	3,5	7,5
Nikopil's place in world production	3.	3.	4.	4.	4.	—	—	—	6.	6.

327 practically all excellent coal); nevertheless, they amply suffice for the industrial needs of Ukraine.

135 316 Ore resources, on the other hand, are considerably richer in Ukraine. The first-class deposits at Kryvyj Rih alone are only a little less than the equally excellent deposits in the Ural (1.2 milliard t, compared with 1.4 milliard t), but as the percentage prospected is low (30 compared with 52 %), it has reserves for the future in its thick seams of iron quartzite. The iron content of the Kryvyj Rih ore being higher, it has greater resources of pure iron metal (540 million t) than the Ural (411 million t). To this we must add the iron-ore deposits at Kerch (2.7 milliard t). The manganese resources of the Donets Combine are the largest in the world (400 million t.).

3: Mirchuk S-4 (no date) 1949 RD1 Ukraine RDJ

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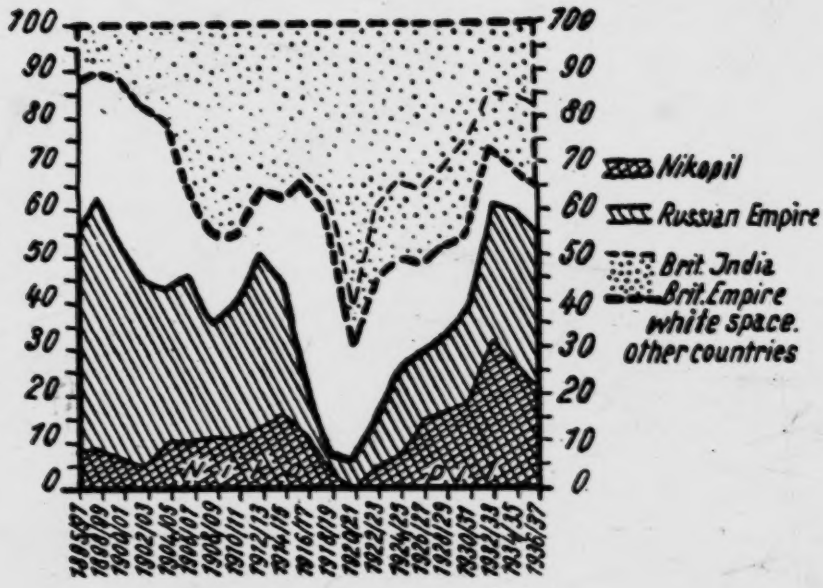

Diagram 6.

Share of Ukraine in the world production of manganese ore (1896—1937)

327 471 quity are first-rate in Ukraine. Heavy industry in Ukraine was characterised from the beginning by the capitalist features that predominated in European production: protective duties and state orders greatly furthered development without handicapping other industrial centers. Pig-iron in Ukraine gradually rose to 19 % of the amount produced in all Russia. In the period 1887—1899 fifteen blast furnaces were added to the two which had been in operation since 1872. In 1913, ten of these were in the coalfields of the Donets Basin, two in the ore areas at Kryvyj Rih and Kerch and five between them. 48 blast furnaces produced 62 000 t each per year, while the 66 blast furnaces of the Ural only produced 12 800 t each and the 14 in the Central Russian area 12 100 t each and even the 11 modern furnaces in Congress Poland produced only 37 500 t each.

The following features were characteristic for Ukraine in contrast to the industrial area of the Ural:

1) a tendency to large-scale production, 2) an inclination for mass production, 3) a striving for concentration in production,

3: Mirchuk S-4 (no date) 1949 RDl Ukraine RDl

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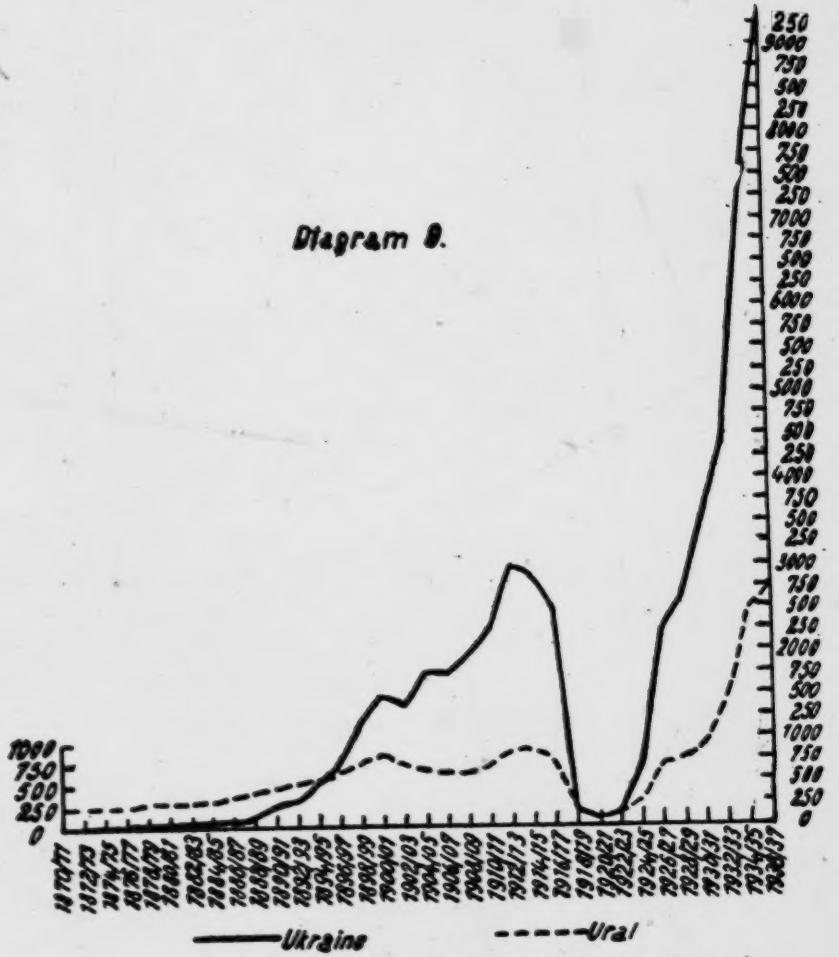

Production of pig iron in Ukraine (1870—1937; in million t).

so that fewer intermediate products were put on the market, 4) a tendency to form cartels or trusts, 5) much foreign capital, 6) a readier response to the influence of crises.

In 1887 pig-iron production in Ukraine amounted to 67 000 t and exceeded the figures for its two weaker rivals and in 1896 (636 000 t) the figure for the Ural. In 1900 it supplied the half and in 1913 $^2/_3$ of the production in the whole of Russia and 4% of that in the world, coming fifth in the pig-iron areas. As a producer of steel, Ukraine came fifth with a total production of

3: Mirchuk S-4 (no date) 1949 RDl Ukraine RDJ

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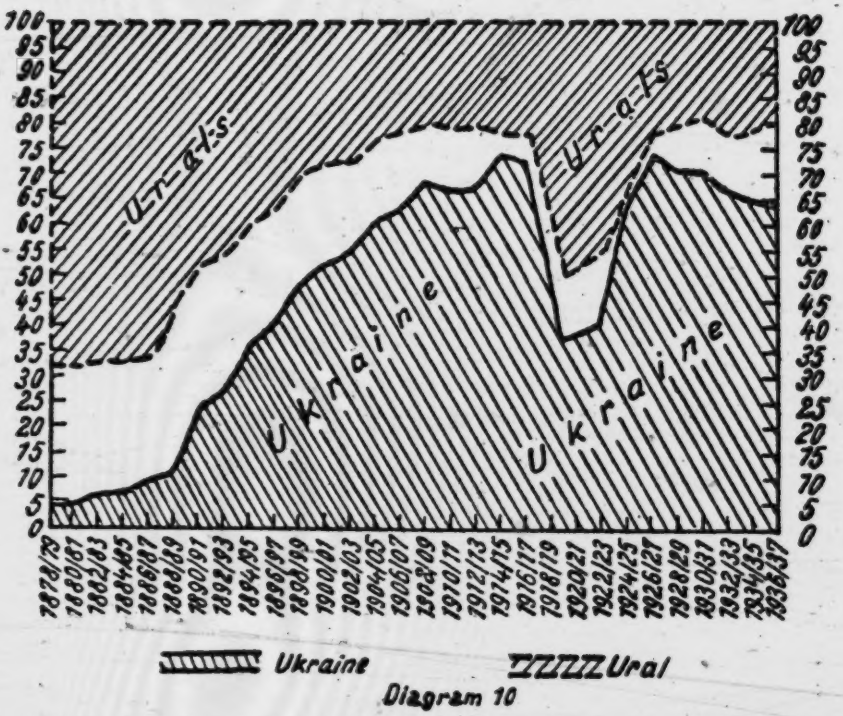

Diagram 10

Share of Ukraine in the production of pig iron in Russia (1878—1937)

2.7 million t, but it lagged farther behind the leading steel producing countries, and its contribution to the production for Russia and for the world was smaller than in the case of pig-iron.

In 1930 pre-war production levels were once more reached: but from 1933—37 pig-iron production increased to 7.5 million t, thus giving Ukraine the third place in world production (76 million t). In the production of steel and sheet iron, it remained fifth. But during the same period, the share of Ukraine in the total Soviet production declined steadily, as a result of the policy of the Five-Year-Plans which diverted more attention and capital to areas outside of Ukraine.

The tendency to increase and concentrate plants persisted after World War I. There were fewer furnaces (44 in 1933), but their average size increased from 382 cubic meters in 1913 to 513 cubic meters and their annual production to almost 100 000 t. The newer furnaces measured even 935 cubic meters. Modern

methods and branches of industry have been introduced, as for instance the production of superior steel and iron alloys. 327

The development of the power-station on the Dnipro entailed a certain change in the location of heavy industry. And the ratio of coal to iron per manufactured unit which was 2.8 : 1 before World War I became 1.6 : 1, though it is still more practicable to transport high quality ores to coal than vice-versa. The Dnipro power-station, however, which is more favorably situated as regards markets and consumption is attracting new foundations of enterprises in heavy industry. This is particularly true of Zaporizha. 371 327

5. Production of Machinery and Metal Goods

Even before World War I, markets were favorable for the production of machinery, above all for agricultural purposes which accounted for the work done for private customers in 126 plants. But modern, large factories were not built till after the war. New branches of production were started, e. g. for motor-cars and tractors (see huge factory in Kharkiv), machinery for mines and precision instruments while the construction of engines and railway trucks increased. The largest factories are in the Donets Combine and in the three large towns; the manufacture of agricultural machines is also distributed over other areas. 392

The non-ferrous metal industry is poorly represented. Between 1914 and 1928 there was practically no increase in the production of mercury (41 000 to 42 000 t). In the Kuban area in 1913 3 000 t zinc and 1 350 t lead were produced; in 1932 these figures were 5 000 and 3 500 t lead respectively. Under the first Five Year Plan zinc factories were erected in connection with the chemical works in Konstantynivka and aluminium works in Kichkas near the power plant on the Dnipro Bend. The annual production of the latter is estimated at 40 000 t. Fuel or power requirements play a greater part than the transportation of raw materials. The production of metal goods is confined to small factories. 328

4: Allen H-4 (no date) 1941 RD1 Ukraine RD1

(Mariupol); 'The Russian Providence' (near Mariupol); 'The Kerch' (near Kerch). In the 'Western' (Dniepr) group the principal works were: 'The Gdantsev' (Krivoy Rog); 'The Dniepr' (near Ekaterinoslav); 'The Alexandrovsky' (near Alexandrovsk). Almost all these works have continued to function under the Soviets; during the course of the last twenty years some have been considerably enlarged and others modernized. Some have been renamed: e.g. 'Alexandrovsky', now 'Zaporogian Steel'; 'Gdantsev', 'Krivoy Rog'; 'Russian Providence', 'Azov Steel'. These three, particularly, have become very important plants.

The Ukrainian and New Russian metallurgical industry comprises 45 blast furnaces and 118 open-hearth furnaces. In the twenty-five years between 1913 and 1938 the output of pig iron has been expanded from 3 million to nearly 8 million tons; rolled iron from 1 million to 3 million; steel from 2 to 5 million tons. Thus, the metallurgical industry of Ukraine and New Russia (excluding the rest of U.S.S.R.) ranks fourth in world production of pig iron (after U.S., Germany and Great Britain) and fifth in the production of steel and rolled iron (after U.S., Germany, Britain and France). In 1938 the Ukrainian and New Russian industries produced 55 per cent of all Russian pig iron, 35 per cent of all steel and 25 per cent of all rolled iron. Concentrated within a comparatively limited region the heavy industry of New Russia and the Ukraine constitutes the most highly developed industrial area of the Soviet Union.

The Revolutionary régime was fortunate in inheriting a wide area of industrialization which, in the immediate pre-Revolutionary period, had been expensively equipped with modern plants by West European capitalist groups. The régime cannot be considered to have achieved anything remarkable in further development, and had the capitalist system of promotion been allowed to survive it is probable that progress would have been more rapid.

The most spectacular (and widely advertised) achievement of the Soviet régime in the Ukraine has been the construction of the grandiose hydro-electric plant in the neighbourhood of the rapids of the Dniepr (Dnieprostroy). A new source of energy (about 600,000 kilowatts), equivalent to a third of the electric energy produced in the Ukraine, has been made available for industry. Dnieprostroy may, however, be considered as a somewhat redundant reinforcement of the power sources of the country which could only have been undertaken by a régime which was not hampered by considerations of productive yield on capital investment. In view of the vast deposits of coal and anthracite to hand and of the as yet unexplored reserves of lignite, the development of a new source of

tons of grain or about 75% of the total amount that they secured in the whole of the former Russian Empire.

This led to new clashes and with the suppression of the larger armed partisan bands, there grew up a new feeling of ugliness that boded ill for the security of the whole regime. The success of the Communists in the industrial centres was thus balanced by their failure to win over any substantial part of the rural population.

In the cities the new regime[1] met with problems of another kind. The workers in the great coal and iron industry where Communism was strongest had at a very early date expelled the managers and foremen and had taken over themselves the operation of the plants, many of which had been ruined in the civil war. Now they found that they were not able to restore production. Industry practically came to a halt and by the end of 1921 there was only one blast furnace operating in Ukraine. The production of pig-iron dropped to 11,300 tons, or barely 3% of the pre-war production. The railroads suffered the same fate. There was no way of repairing them and without a trained administrative staff, they almost stopped functioning. This, in turn, increased unemployment and a lack of food in the cities and once more the city dwellers began to stream out into the country districts.

As a final blow there came in 1920 one of those periods of drought which have recurred sporadically in Ukraine throughout the centuries. In view of the general decay in transportation and the ravages of the war, this became serious and the situation grew even worse when the same phenomenon was repeated in 1921. Between the drought and the raiding detachments, the peasants had no reserves of grain and a famine broke out which cost the lives of several million Ukrainians.

This famine was very definitely the result of Communist mismanagement, plus the drought, but the Soviet regime was unable to take any effective counter-measures. When its extent was realized, the regime allowed through the League of Nations the organization of the American Relief Administration under Herbert Hoover. This collected and sent to the stricken areas large quantities of grain but it carried on its work with such impartiality that

[1] [Ukrainian Soviet Republic established 1919 -- Analyst]

631 into three classes: Union, Joint and Republic. Thus, those of
642 Foreign Affairs, Armed Forces, Foreign Trade, Communications,
645 Water Transport, Posts and Telegraphs, Heavy Industry, Light Industry, Supply and Timber had full control over the corresponding sections in the federal republics. Those of Internal Trade, Labor, Finance and Workers' and Peasants' Inspection were nominally joint commissariats but, in case of a dispute between the Union and the Republic commissariats, the rights of the former were supreme. The remaining commissariats, Interior, Justice, Education, Health, Agriculture, and Social Welfare were still left under the Executive Committee of the Republic Supreme Soviet. It was thus very evident that, except in a few fields, the powers of the Ukrainian Soviet Republic to decide its own destiny were practically non-existent.

It goes quite without saying that it was these local commissariats which attracted the Communists of Ukrainian origin, whether or not they belonged to the Ukapisty or had joined the Ukrainian Section of the Russian Communist Party as former members of the Borotbisty. This was a very important development in the next decade in Ukrainian history and it was due to the relative freedom of the Commissariat of Education that the Ukrainian cultural renaissance took the form which it did.

655 At the same time, despite all the verbiage and the apparent
●327 exceptions, it was abundantly clear from the very beginning that
185 the economic system of the Ukrainian Soviet Republic was to be bound hand and foot to the Moscow regime and that its financial and industrial potentialities would be treated as Moscow wished.

It was relatively simple to deal with industry. The development of the coal and iron resources of Ukraine were simply transferred to Moscow control and it was practically impossible for the Ukrainians to express any opinion as to the form which that development would take. The Russian directors of the trusts could make such contracts as they desired and carry them out without regard to the wishes of the local population or the workmen.

432 Agriculture was a little more difficult. The decree of 1921,
241 which had started the New Economic Policy, provided for the
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7:Bregy & Obolensky H-4, 5 (no date) 1940 RD1 Ukraine RD1

316 mines of the Krivoi-Rog and secondly the presence between these two centres, in the surroundings of Nikopol, of important deposits of manganese, whose annual extraction exceeds 1,000,000 tons.

Actually the proximity of the mines of Krivoi-Rog, the resources of which, according to the exact estimates of geologists, are considerable (1 milliard 100 million tons of mineral which contains 40 per cent of iron), has allowed the distribution of the whole iron industry of the Ukraine between these two regions—that of the 316 Donietz and that of Krivoi-Rog. This centralization 489 allows one to utilize on the spot the enormous quantities of coal and of employing the railways in the most economical way, thus reducing the transport charges which are a heavy item in relation to a material.

The whole traffic between these two regions goes in two directions. The coal of the Donietz is loaded on trucks which are directed towards the Krivoi-Rog. These trucks return with a load of minerals. Thus a continual exchange takes place between these two centres, resulting in a very small circulation of empty trucks and thus creating one of the essential conditions of a rational exploitation of the railways.

316 The centralization of the Ukrainian metal industry 433 strongly favours its development. The Ukraine to-day occupies one of the leading places in the production of pig-iron (the fourth place, with 6,500,000 tons annually), of steel (third place, with 5,000,000 tons annually), and of sheet-iron (fifth place, with 3,000,000 tons annually).

327 The shaping of the metal and its transformation into metallic manufactured objects is equally concentrated on the borders of these two producing regions. Thus only 18 per cent of the coal of the Donietz and 5 per cent of the raw mineral of the Krivoi-Rog are exported from the Ukraine. The rest is shaped and worked on the

7:Bregy & Obolensky H-4, 5 (no date) 1940 RD1 Ukraine RD1

spot and leaves the country in the form of special steels, of sheet-iron, of all sorts of machines and tools, as well as of chemical products.

The two mining regions and the regions of Dniepropetrovsk possess forty-five furnaces having a volume of 25,000,000 cubic metres and more than 110 Martin ovens. Russian industry still depends to-day in great measure on the factories of the Ukraine.

As we have seen, the state of industry in the Ukraine, especially of heavy industry, is conditioned by the geographical position of its raw materials and of the sources of energy. All the metal is concentrated at Krivoi-Rog and the source of energy is represented in the first instance by the coal of the Donietz.

The peat bogs dispersed over the whole territory and whose extent does not exceed 400,000 hectares and the production 500,000 tons, and the brown coals the extraction of which is only 300,000 tons, can enter into the calculation only as auxiliary fuel of a definitely local importance.

The Ukraine, on the contrary, is well supplied with hydro-electric plant. This energy is mainly given by the station of *Dnieprogues*, better known under the name of '*Dnieprostroi*,' which means 'Construction on the Dnieper.' This name was especially valuabie during the building of the station which, having been finished, has taken the name of '*Dnieprogues*,' an abbreviation of '*Dnieprov*skaia *Gu*idro-*E*lectritcheskaia *S*tantsia,' which means 'hydro-electric station on the Dnieper.' Built by the Soviets on the rapids of this river, it employs the energy and the power which reach 600,000 kwh.

In the other regions of the Ukraine the network of hydro-electric stations is relatively poor, as the rivers do not provide the necessary resources in this respect. The existing stations serve the mills, the oil mills, the sugar refineries, or the town stations of small power.

7:Bregy & Obolensky H-4, 5 (no date) 1940 RD1 Ukraine RD1

377 The functioning of the *Dnieprogues* station, which could open enormous possibilities of development of all kinds of industries and of the electrification of the railways, has nevertheless, despite its enormous power, failed to change the industrial geography of the Ukraine because it is just half-way between the Donietz basin and Krivoi-Rog and thus does not bring about any alteration in the distribution of the sources of energy.

438 Thus the heavy industry of the Ukraine remains, in its greater part, concentrated around this region, round Nikopol and along the northern edge of the Donietz basin.

325 Kharkov and its surroundings are the greatest metallurgical centres of the Ukraine. There great factories of turbines, of generators, of electrical machines, of tractors, of locomotives, of railway trucks, and of factory equipment, etc., are to be found.

327 The production of sheet-iron and of steel rails, tubes, plates, beams, wire, etc., is distributed among many factories of the Donietz basin, at Nikopol and at Dniepropetrovsk.

Zaporojie (not far from Krivoi-Rog and near the *Dnieprogues*) produces nearly 60 per cent of the special steels of the Union. The Soviets intend to create a new powerful centre of metal industry there.

391 Apart from Kharkov, factories producing all the
392 heavier machines such as locomotives are to be found in the Donbass (abbreviation of Donietz basin which we will now use), at Lougansk, and at Kramatorski, where an enormous newly constructed factory is one of the largest in the world.

402 The equipment for the light industry—the mills, wine-presses, oil mills and elevators—is chiefly manufactured at Berdiansk (Donbass), Melitopol (Northern Taurida), Tcherkassy (centre), Kiev, and Odessa.

392 Agricultural machinery comes from the factories of

7:Bregy & Obolensky H-4, 5 (no date) 1940 RD1 Ukraine RD1

The possibilities of the development of this industry are enormous. The excellent quality of the vegetables and fruits and the big supplies of fish at the mouth of the Dnieper would have been able to give this industry a great importance, but in this respect the Soviet Government has shown especial incompetence.

Light industry in the exact sense of the word is relatively little developed in the Ukraine. Apart from a few saw mills, soap factories, skin and leather works, furniture works, perfumeries, and porcelain factories, there is little which would attract our attention. We will limit ourselves to simply mentioning them. One cannot really speak of a textile industry. The whole Ukraine has only three factories and only produces 3 per cent of the textiles manufactured in Russia.

If agriculture is in a state of curtailment since the appearance of the Soviet regime, if neither light industry nor the means of communication have made any progress (which is equivalent to an absence of progress), the production of minerals and the metal industry show great development, especially since 1932, to which must be added the construction of the *Dnieprogues*.

This progress is not only manifested by the increase of production, but by the centralization of the metal industry in the districts in which the raw materials are extracted. Before the last war the Ukraine was a country of a great surplus of corn, iron, and coal. To-day the surplus of her production is represented by manufactured metal goods and in this her economic potential is found to be radically changed.

The displacement and the development of the industrial potential of the Ukraine ought to have resulted in the increased welfare of her population. Nothing like that has been achieved.

Neither the aim nor the object of this book allow us

9: Prothero G-4 (no date) 1920 RD1 Ukraine RD1

ing both from abroad and from other parts of Russia. The two principal exceptions to this rule are manufactured food-stuffs, and heavy iron and steel products.

Sixty-eight per cent. of the manufactured products of the country consist of food-stuffs. The industries contributing to this output are various, including flour-milling, sugar-refining, and those dependent wholly or partly upon sugar, such as confectionery, fruit-preserving, distilling from molasses, brewing, and wine-making. Most of the undertakings concerned have only a small capital, and are situated near the source of their raw material. In the neighbourhood of Kiev, however, sugar-refining and its dependent industries are carried on in large works, many of which are capitalized from abroad.

The close conjunction of the Donets coalfield and the iron and manganese deposits has enabled the Ukraine to be almost entirely self-supporting in iron and steel manufactures of the first categories, and to supply the wants of the remainder of Russia as well. Pig-iron, bar-iron, roof-iron, steel rails, axles, tubes, and assorted merchant iron are all made in the iron-works which have been established in increasing numbers on the coal and iron fields. These works are seldom in large centres of population, but as a rule in small towns and villages, some of which owe their existence to the need of housing for the labour employed.

The output of raw iron and steel in the first stage of manufacture under the headings of Bessemer and Thomas bars, Martin-process bars, cast-iron and steel billets, and cast-iron tubes, was in 1906 1,300,000 tons, and in 1910 1,900,000 tons. The output of iron and steel in the second stage of manufacture, under the headings of T and H beams, rails, sheet-iron, rolled wire, roof-iron, trusses, springs, assorted merchant iron and axles, was in 1906 1,010,000 tons, and in 1910 1,602,258 tons. In the former year the output in both stages was equal to about 45 per cent., and in the latter year to about 55 per cent., of the total Russian output.

9: Prothero G-4 (no date) 1920 RD1 Ukraine RD1

433 The development of the industry on a large scale
327 dates from the year 1870, when a British subject named Hughes received from the Russian Government a concession for the manufacture of iron rails. The company founded by him exists to-day under British management at a place called Hughesovka, and is known as the New Russia Co., Ltd. It has been followed up by a great number of other enterprises, some Russian, but most founded by British, French, and Belgian capital, which has been freely invested in the industry during the last forty years, particularly between 1880 and the end of the century.

392 Agricultural machinery is in constant demand.
433 When first used in the country, it had all to be imported, but of late it has been manufactured in the Ukraine in increasing quantities. Although the customs duties on agricultural machinery are low—certain types in fact are admitted free—the machinery made in the country finds more favour every year. For certain complex machines the Ukraine is still dependent upon imports, but, apart from these, it will probably be able in time to produce all the agricultural machinery it needs. In 1913, out of a total of 770 agricultural machinery factories in Russia, 271 were situated in the Ukraine. The value of their output was 31,000,000 rubles, that of the whole of Russia being 54,000,000 rubles. In addition to the production of the factories, large quantities of tools and machinery of the simpler sort are made by domestic workers, working single-handed or in small syndicates.

The principal agricultural machinery works are in the Governments of Kherson, Yekaterinoslav, Taurida, and Kharkov. The firms John Greaves & Co. and E. L. Mathias & Sons (Berdyansk), Hartmann Machinery Co. (Lugansk), H. A. Klassen (Sofiesk), R. & E. Elworthy (Yelisavetgrad), I. I. Hoehn (Odessa), and Franz & Schroeder (Neu-Halbstadt), are among those doing the largest business, and the names of the concerns show how largely foreign enterprise has entered this field, none having a Russian title. At Kiev and Kharkov

135 The third oil region lies close by the Ukrainian border, many hundreds of kilometers distant from the compact Russian area of settlement, not far from the Caspis on the Terek. These reserves are estimated at 900 million tons. In 1925 2 million tons were extracted, in 1932 over 8 million tons, and in 1933 somewhat more than 5 million tons. (103) From the occurrence of inflammable and

103. Kubiyovich: Atlas...,page 53.

earth gases, oil reserves are suspected to be present on the northern coast of the Sea of Azov and along the Dniestr. The salts in the Donets Basin and along the Carpathians, and the sea salt near Odessa round off the wealth of natural resources. Potassium salts are deposited in Galicia, potassium gluconites in East Podolia, at the Dnepr and near Isyum; phosphates in Podolia along the Dnestr and in northern Ukraine near Chernigov; excellent kaolins are found in the region between Volhynia and the Black Sea, and graphite near
312 Krivoy Rog. The entire water-power reserves of the Ukrainian provinces are estimated at 9 million horse power; of this only one-tenth was utilized in 1932. /163/

•329 Two industrial regions are connected with local natural resources. These are, first, the Donets Basin, rich in coal and salt, with coal mines, coke plants, foundaries and steel works. Here ore from Kerch and Krivoy Rog is smelted. Secondly, there is the mining district of Krivoy Rog and Mykopil on the Dnepr with iron and manganese mines, smelting factories, foundaries and metallurgic factories. With the completion of the large Dnepr power plant at Zaporishea - the normal water level was raised 37.5 meters by the construction of a mighty cofferdam and sluice along the entire rapids, which made the river navigable throughout - the industrial region of Krivoy

327 Rog received an important complement. Supplied by the 436,000 kilowatts of the power plant, a new industrial combine was established in this region, with iron and steel works, with factories for aluminum, alloys, for cement, soda, ammonia, sulfurous acid and similar chemical products. In this district agricultural and heavy machinery is also built. The pig iron production of 47 Ukrainian blast furnaces amounted to 3.1 million tons in 1913, 4.3 million tons in 1932, and 6.7 million tons in 1934; steel production during the same years came to 2.7 million tons, 2.2 million tons and 5.4 million tons, and the production of malleable iron in each case came to 2.3 million, 2.2 million and 2.9 million tons. (104)

104. Kubiyovich: Geography of the Ukrainian and Bordering Areas, page 455.

402 The manufacture of heavy industrial raw products for machines and implements of all kinds occurs in the scattered industrial cities, especially in the part of the Ukraine on the right bank of the river. Khar'kov, with its construction of heavy machinery, agricultural machines, precision instruments and transport machines such as locomotives, railroad cars and tractors, stands at the head of Ukrainian industrial cities. In Kiyev ships, heavy machinery and chemical and electrotechnical machines are built, and in Odessa agricultural machinery, precision instruments and motor cars. Here canning and leather industry is also carried on. In Mariupil /164/ and Taganrog there are foundaries. In almost all larger harbors of the Black Sea coast, ships are built. In the Crimea there are canning and tobacco factories.

433 After Ukrainian industry suffered severe reverses as a result of the First World War and the Revolution, a wave of industrialism set in with the first Five Year Plan in 1928. The wealth of

SU
464 The number of workers and employees in the national economy of the
874 U.S.S.R. increased by 3 million. Vocational schools and factory training centres graduated thousands of skilled workers, and improved the skill of several millions already employed.

SU
727 Of the districts which suffered occupation, economic rehabilitation
433 as well as capital construction amounting to 17,500 million roubles in
652 1946 made it possible to increase their industrial output by 28 per cent. as compared with 1945. Pravda writes - "the factories, mills, pits, power stations, towns and villages which were destroyed by the enemy are being revived one by one...."[1]

In the Ukraine

U
727 The Ukraine has been likened to one big building site, where more
433 than 500,000 workers are engaged in restoring industrial plants and
327 municipal buildings.[2] In the Donets Basin, the coal output of 1946 was 30 per cent. higher than that of 1945. In the Ukrainian iron and steel industry, 21 blast furnaces, 58 steel-smelting furnaces, 60 metal and pipe-rolling mills, and 71 coke batteries were at work by January 1947. Of 104 machine-building factories to be restored, 102 were already producing goods, and mastering the production of improved types of machinery. The Kharkov transport machine-building works was preparing to build long-distance steam engines; and the tractor works was increasing its production, as were many other factories.

U
727 In 1946 the Kharkov turbo-generator works made a 100,000 kilowatt
433 turbine and one of 50,000 kilowatts. At Dniepropetrovsk, a lorry
393 factory was being built; and in Odessa and Lvov, automobile assembly
398 works were under construction. Great work was also being done in the development of light industry, food processing, chemical works, and other branches of industry.

U
727 After three years' work of restoration the Dnieper Dam had been
433 rebuilt in the main, and the housing for the power station erected.
377 By the end of 1946 the capacity of Ukrainian power stations had reached 70 per cent. of pre-war.

U
362 Since the liberation over 104.5 million square feet of floor space
368 had been restored in the Ukraine. Over half a million of the 590,000 houses destroyed by the Germans were restored or built anew in Ukrainian villages; and more than 13,000 cultural institutions in the villages and 118,000 auxiliary buildings on the farms.[2]

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1 Pravda, quoted by Soviet News, London, January 22, 1946

2 Soviet Monitor, London, January 23, 1947.

727 In August 1941 the retreating Soviet army troops partially disabled
397 the Dnieper Dam and power station to prevent its falling into enemy hands. This destruction was later completed by the Germans. When the Soviet Army recaptured the region, they found that 35 of the dam's 48 piers had been blown up, and all the generators destroyed. Damage to the power house alone was estimated at 500,000,000 roubles.

Reconstruction work began in February 1944, when the war was still on. Three years later the assembly of the first power unit of 72,000 kilowatt capacity was completed; and on March 3, 1947, the Lenin Hydro-electric Station supplied its first post-war currency to the industry of the Dnieper Valley.

There are over 11,000 men and women engaged on the restoration job, which has involved repairing the dam and the underwater structures, building the housing for the power station, and mounting the machines. Another two power units are to be assembled later this year.

After the expulsion of the Germans from the Ukraine, the capacity of the Republic's power stations was only 0.4 per cent. of pre-war. By the end of August 1946 restored capacity had reached 47 per cent. In the Donets Basin 70 per cent. had been restored, and in the Stalino area, 79 per cent. In the city of Lvov (Western Ukraine) the pre-war capacity of its electric power stations had been surpassed by 18 per cent. In the first seven months of 1946 much had been accomplished: some 400 power stations, including 215 hydro-electric plants, had been launched in the Ukraine; and it was expected that 750 more power stations would be completed by the end of the year.

The Five-Year Plan fixes the 1950 output of electric power in the Ukraine at 13,690 million kilowatt hours. The total capcity of Ukrainian power stations is to be increased in 1946-50 by 2,57_,000 kilowatts. The Five-Year Plan directs that:-

"The Lenin Hydro-electric Station on the Dnieper shall be rebuilt. Small hydro-electric power plants with a total capacity of 203,000 kilowatts shall be built to meet the requirements of agriculture and local consumers. Plant aggregating 95,000 kilowatts shall be put into operation at municipal electric power stations."

The restoration of electric power facilities will assist greatly in rehabilitating other sections of the Soviet economy

Iron and Steel

185
327 The Five-Year Plan for the Ukrainian S.S.R. envisages an output in
433 1950 of 9.7 million tons of pig iron, and 8.8 million tons of steel.

In order to accomplish this, the iron and steel plants of the Donets Basin and the Dnieper region are to be rehabilitated; and there are to be put into operation 30 blast furnaces with an aggregate annual capacity of 9 million tons of pig-iron, steel smelting units with a

[185] 327 433 capacity of 8.4 million tons of steel, and 58 rolling mills with a capacity of 6.5 million tons of finished rolled goods.

In view of the enormous destruction of industry during the war, these aims are heroic, because they in fact mean that for five years the Ukrainian iron and steel industry will be striving to regain and then even to exceed, the production of 1940. This is shown by the following table, which gives the pre-war output of iron ore, manganese ore, pig-iron, and steel, as well as the planned output of the latter two in 1950. Figures for the U.S.S.R. as a whole are also included for comparison.

TABLE XIX

Ukraine: Production of Pig Iron and Steel
(thousand metric tons)

Year	Iron ore		Manganese ore	
	Ukrainian S.S.R.	Whole U.S.S.R.	Ukrainian S.S.R.	Whole U.S.S.R.
1928	4,671	5,700	531	1,200
1932	7,925	12,100	443	1,400
1937	16,414	26,000	957	2,000

Year	Pig iron		Steel	
	Ukrainian S.S.R.	Whole U.S.S.R.	Ukrainian S.S.R.	Whole U.S.S.R.
1928	2,361	3,300	2,409	4,300
1932	3,911	6,200	3,128	5,900
1937	8,801	14,500	8,467	17,700
1940	9,200	14,900	8,600	18,400
1950 (Planned)	9,700	19,500	8,800	25,400

Note: 1940 figures not available for iron ore and manganese ore.

Sources: Socialist Construction, Moscow, 1939; Russia's Economic Front for War and Peace, A. Yugov, C.A. Watts and Co.Ltd., and The Five-Year Plan, 1946-50.

As the table shows, areas of the Soviet Union other than the Ukraine are expected considerably to increase their production during the next several years. This, as well as the complete revival of Ukrainian plants, is particularly necessary to rebuild the transport system, and to replace tractors, machinery, and farm implements which were either stolen or destroyed during the war.

Progress in Rebuilding

327
727 In 1946, nearly all of the ferrous metal plants in the Donets were put into working order once more. The biggest blast furnace in the Ukraine started operating again in the Azovstal works; two other blast furnaces were put into operation, one in the Dzerzhinsky works at Dnieprodzerzhinsk and the other in the Nikeyevka iron and steel works, where the mounting of a great blooming mill was also completed. The open hearth furnace at the Petrovsky works, two coke batteries of the Dzerzhinsky works, coke battery No.2 at the Mariupol coke and chemical works, the rolling mills at Yenakievo and Kramatorsk, and a number of other units of the iron and steel industry started operations.[1]

Altogether by the end of 1946 there were 21 blast furnaces,[2] 58 steel-smelting furnaces, 60 metal and pipe-rolling mills, and 71 coke batteries at work in the Ukrainian S.S.R.[3]

The iron mines in the Krivoi Rog basin (Ukraine) had been 85 per cent. restored. Another five big iron mines are to be put into operation this year, and by 1950 ore extraction in the Krivoi Rog area is expected to surpass the pre-war output.[4]

However, the task of reconstruction is still immense. Many of the large plants are still greatly disabled. The largest iron and steel plant in the Ukraine (at Zaporoshie) was systematically destroyed by the Germans.

This factory, with its three blast furnaces, ten open-hearth furnaces, strip and rolling mills, and 25,000 kilowatt generator, was still expanding when the war broke out. A small amount of light equipment was evacuated, but the bulk of equipment and all of the structures housing it were damaged or destroyed. Soviet engineers estimate that 65 per cent. of the value of the equipment was destroyed. Total restoration costing seven hundred million roubles will take from three to four years. Full restoration will require vast amounts of iron and steel for repairing the plant, of mechanical equipment for operating the plant; and of materials to rebuild the houses of the workers.[5]

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1 Soviet News, London, January 23, 1947.

2 On January 1, 1935, there were 55 blast furnaces in the Ukraine (55 per cent. of total U.S.S.R. capacity) and 117 open-hearth furnaces (40 per cent. of total U.S.S.R. capacity).

3 Soviet Monitor, London, January 23, 1947.

4 Soviet Monitor, London, January 28, 1947.

5 UNRRA Mission to the Ukraine, Kiev.

Heavy Industry Building in 1947.[1]

● 327 727 Reconstruction and building will be on a wider scale in 1947, as heavy improvements are introduced. Mechanization is being extended in blast furnaces, open-hearths, and metal-rolling shops; and ore and coal stores are being equipped with modern cranes.

In the Donets Basin in 1947 the Stalino Metal Works are to put into operation another blast furnace, martan oven and rolling mill.[2] At the Azovstal works the two blast furnaces of 1,000 cubic metres each will be enlarged to 1,300 cubic metres. Also at the Azovstal works, which in the past did not produce any rolled metal, are being built a blooming mill, which will be the largest in the south, and a rolling mill. New blooming mills and rail rolling mills are also to start at the Petrovsky works in Dniepropetrovsk, and at the Dzerzhinsky works in Dnieprodzerzhinsk. New pipe-rolling workshops will be added at the Nikopol Yuzhno-Trubny and the Dniepropetrovsk works.

At the Zaporozhstal works in 1947 several workshops will be added; and a power station and a 1,300 cubic metre blast furnace will begin working in the first half of the year. Among the most urgent tasks at this plant is the reconstruction of machines producing sheet metal for automobile production.

Equipment for Iron and Steel Mills

According to the new Five-Year Plan, the Ukrainian output of equipment for iron and steel mills in 1950 has been fixed at 35,000 tons; the total production of the entire Soviet Union has been fixed at 102,900 tons (of which 66,700 are to be produced by the Russian Soviet Federative Socialist Republic).

Production of Tractors

727 407 433 Before the war there were about 90,000 tractors in operation on Ukrainian farms. During the occupation, 56,000 of these were wrecked or stolen by the Germans, who also completely destroyed the well-known tractor factory at Kharkov. Because of the particularly great need of tractors in the Ukraine, this factory was rebuilt with great vigour; and production resumed. By February 1947 the Kharkov Tractor Works had produced 3,000 tractors since the restoration of the plant.

The 1950 output of tractors in the Ukraine is expected to be 25,000; for the entire Soviet Union, production has been fixed at 112,000 tractors.

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1 See U.S.S.R. Deputy Minister for the Construction of Heavy Industry Enterprises, Radio Moscow, February 3, 1947, B.B.C. Digest of World Broadcasts No. 274, London, February 5, 1947.

2 Soviet Monitor, London, January 2, 1947.

23: Shabad N-4 (no date) 1951 R1 Soviet Union R1
Ukraine RD2

metropolitan areas of Moscow, Leningrad, and other industrial centers, as well as the entire southern rail network of the USSR west of the Volga and south of the Moscow coal basin. During the period of the German occupation of the Ukraine (1941–43), the coal mines suffered greatly. At present, reconstruction work is in full swing, mines are being reestablished, and it is hoped to have reached prewar production by the end of the post-war Five-Year Plan. The major coal-mining centers are Stalino, Yenakiyevo, Gorlovka, Kadiyevka, Chistyakovo, Krasnyy Luch, and Sverdlovsk. Anthracite, used principally for fuel, is mined in the eastern and the southern sections, while coking coal is produced in the western and the northern parts of the Donets Basin.

The giant iron and steel mills of the Ukraine lie mainly in the western part of the Donbas, that is, in the coke-supplying area, in the Krivoy Rog iron basin, and along the Dnieper between these two raw-material sources. Among the mills producing over one million tons of pig iron per year are modernized prerevolutionary plants at Makeyevka (Donbas), and at Dnepropetrovsk and at Dneprodzerzhinsk on the Dnieper and new plants at Krivoy Rog, Zaporozh'ye, and Zhdanov. The Azovstal' mills at Zhdanov use Kerch' (Crimea) iron ore, which is shipped across the Sea of Azov.

Machine construction has been developed to a very large extent in the Ukraine in recent years. Due to the close proximity of the sources of metal and in view of the lack of skilled local labor, the Ukraine was designed to produce types of machinery requiring little precision work, but large amounts of metal. Plants located in the Donbas specialize in heavy machine construction; among them, Kramatorsk produces coal-mining and steel-milling machinery, and Voroshilovgrad has a large locomotive works. Agricultural machinery plants are located along the Dnieper and on the right bank. Khar'kov possesses a large tractor plant and locomotive works and produces hydro-turbines and electric motors. There are car-building works at Nikolayev and Dnepropetrovsk, shipyards at Nikolayev, Kherson, and Kiev, and oil-drilling machinery is made in L'vov.

The industrial picture of the Ukraine includes a number of factors suitable for the establishment of a strong chemical industry: the by-products of coking and metallurgical processes, the presence of such important raw materials as salt and phosphorites, the availability of cheap energy produced by coal-fed (*Zugres* and *Shtergres*) or hydroelectric (*Dneproges*) power stations, and finally the need for chemical products

23: Shabad N-4 (no date) 1951 Rl Soviet Union Rl
Ukraine R01

site of the battle of Poltava (1709), which marked the decisive defeat of the Swedes under Charles XII by Peter the Great.

Kremenchug, a lumber- and grain-trading point on the Dnieper, has light and food industries and produces road-construction machines. Its right-bank suburb, Kryukov, has large railway-car works.

Sumy Oblast

Area, 9,400, population, 1,700,000

Sumy Oblast, lies in the western outliers of the Central Russian upland and is drained by the upper Vorskla, the Psel, the Sula, and the Seym rivers. Basic crop combinations are sugar beets and wheat in the south, and hemp and wheat in the north. Also grown in the north are potatoes and buckwheat; in the south, tobacco and mint. Sugar refining, flour milling, and hemp retting are the chief industries. An oil field is under development near Romny.

Sumy is a sugar-refining center on the Psel River; it produces also agricultural machines, chemical fertilizer, and woolens.

Other industrial cities are Konotop, a rail junction with machine shops and food industries, and Shostka, which produces chemicals and photographic film.

DONETS BASIN

The Donets Basin, which includes the oblasts of Voroshilovgrad and Stalino, is the most heavily industrialized section of the Ukraine and one of the principal industrial bases of the USSR. The impressive industrial development of the district is the result of the combination of local coal production and the iron-ore imports from the Krivoy Rog area, which forms the basis of the large-scale metallurgical industry. Nearly all the major mills concentrated in the Donbas pass through a full cycle of metallurgical production; they had a prewar capacity of 6 million tons of pig iron, 5½ million tons of ingot steel, and 3 million tons of rolled metal. The coking process, which is essential for the iron and steel industry, also feeds the basic chemical industries producing nitrate fertilizer and other chemicals. The use of iron and steel products in the heavy-machine industry completes the industrial scheme of the region. Associated with these principal activities are the quarrying of building and flux materials (dolomite, limestone, refractory clays, and cement rock), the mining of salt, mercury, and lead-zinc ores, as well as large

23: Shabad N-4 (no date) 1951 R1 Soviet Union R1
Ukraine R01

glass and soda works. A dense rail network and a unified power-transmission system connect the various enterprises. The vast number of urban centers, cities and workers' settlements, which have grown up around the metallurgical and machinery works and the coal mines, represent a concentration of almost one third of the urban population of the republic within 1/20 of its area.

Stalino Oblast

Area, 10,200, population, 3,000,000

Stalino Oblast includes the western section of the Dönets Basin, extending from the Sea to Azov in the south to the Northern Donets in the north. Agriculture (wheat, sunflowers, and cotton) is of importance only outside of the industrial section. Salt is mined near Artemovsk and mercury near Nikitovka. The principal coal-mining centers are Stalino, Makeyevka, Yenakiyevo, and Gorlovka.

Stalino, the largest city of the Donets Basin, had a population of 392,000 in 1948. It was originally called Yuzovo, or Yuzovka, for a Scottish industrialist, Hughes; it was called Stalin in the early part of the Soviet period. It has metallurgical, chemical, and coal-mining industries.

Makeyevka, a few miles northeast of Stalino, is the site of the Kirov metallurgical works, one of the largest of the Donbas, and coking installations. Coal mines operate in the suburban areas.

Yenakiyevo was called Rykovo from the 1920's until 1935, then Ordzhonikidze until 1943, when it again received its original name. It has a metallurgical industry, chemical works, and coal mines.

Gorlovka also has metallurgical, chemical, and coal-mining industries. Its northern suburb of Nikitovka has mercury mines and near-by Trudovaya is the terminus of an oil pipe line from the Groznyy fields in the Caucasus.

Konstantinovka has a metallurgical industry, zinc works, and produces ceramics, glass, and cement, as well as superphosphate fertilizer.

Kramatorsk is noted as a heavy-machine construction center which produces mining and metallurgical equipment. It also has railway-car repair shops and ceramics works. Druzhkovka, to the south, is another machinery center.

Slavyansk is a chemical center where there are salt mines and soda works, limestone quarries, and porcelain works. Artemovsk (formerly Bakhmut), to the southeast, is the center of an important salt-mining